

CLAIMS

1. A process for marking an article by applying thereto a taggant, a marking formulation comprising a taggant, or an article marked with a taggant, wherein the taggant comprises a plurality of microparticles having two or more distinguishable
5 marker layers corresponding to a predetermined numeric code,
the invention characterized in that:
the plurality of particles comprises a plurality of microparticle sets of at least one
microparticle,
each microparticle set is characterized by a specific marker layer combination
10 different from each other microparticle set, and
the combination of microparticle sets employed in said taggant collectively forms
said numeric code.
2. The invention of claim 1 wherein the marker layers each comprises a
15 distinguishably different color or color enhancer.
3. The invention of claim 1 wherein the each said specific marker layer combination
has the same number of layers.
- 20 4. The invention of claim 1 wherein each said specific marker layer combination
employs two or three layers.
5. The invention of claim 1 wherein each said specific marker layer combination
employs two layers, the numeric code is a binary code having a predetermined number of
25 places and having two values at each place, each microparticle set codes for one said
value in a specific place in the code and the absence of said microparticle set in the
taggant codes for the other said value at said specific place.
6. The invention of claim 1 wherein the taggant further comprises an adhesive.
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7. The invention of claim 1 wherein the microparticle sets employed in the taggant
include at least one datum marker layer coded to include place information and at least
two value marker layers coded to specify a value within the place, the at least one datum

marker layer being readily distinguishable from the value marker layers and functioning to identify an orientation of the value marker layers.

8. The invention of claim 7 wherein the at least one datum marker layer is selected
5 from at least two distinguishable marker characteristics.

9. The invention of claim 8 wherein each said microparticle set is made up of three-layer particles composed of one said datum marker layer and two value marker layers.

10 10. The invention of claim 9 wherein each distinguishable marker characteristic is a visually distinguishable color or color enhancer or a color, magnetic or radioactive feature distinguishable by a sensing machine.

11. The invention of claim 7 wherein the marker layers each comprises a
15 distinguishably different color or color enhancer.

12. The invention of claim 7 wherein the each said specific marker layer combination has the same number of layers.

20 13. The invention of claim 7 wherein each said specific marker layer combination employs three or four layers.

14. The invention of claim 7 wherein each said particle set represents a value at a given place, the at least one datum marker layer codes for said place and the combination
25 of value marker layers codes for said value at said place.

15. The invention of claim 14 wherein the at least one datum marker layer is selected from at least two distinguishable marker characteristics, the at least two value marker layers are selected from at least three distinguishable marker characteristics, the total
30 number of distinguishable marker characteristics is a fixed number and the number of marker characteristics allocated as datum markers and as value markers, respectively, is selected to minimize the number of different microparticles necessary to sequentially

represent all values within a predetermined range of values with said fixed number of marker characteristics.

16. The invention of claim 15 wherein each said marker layer combination has three
5 layers.

17. The invention of claim 1 wherein the numeric code comprises date information.

18. The invention of claim 17 wherein each marker layer combination has three
10 layers.

19. The invention of claim 18 wherein said numeric code includes one said marker layer combination coded to indicate a year.

15 20. The invention of claim 19 wherein said numeric code further includes two said marker layer combinations coded to indicate a day within said year.

21. The invention of claim 19 wherein said numeric code further includes a second said marker layer combination coded to indicate a month within said year and a third said
20 marker layer combination coded to indicate a day within said month.

22. A process for marking an article by applying thereto a taggant, a marking formulation comprising a taggant, or an article marked with a taggant, wherein the taggant comprises a microparticle having three or more distinguishable marker layers
25 corresponding to a predetermined numeric code, said marker layers comprising at least one datum marker layer coded to include place information and at least two value marker layers coded to specify a value within the place, the at least one datum marker layer being readily distinguishable from the value marker layers and functioning to identify an orientation of the value marker layers.

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24. The invention of claim 23 wherein the combination of value marker layers collectively determines said value within said place.

25. A process for marking an article by applying thereto a taggant, a marking formulation comprising a taggant, or an article marked with a taggant, wherein the taggant comprises a microparticle having two distinguishable marker layers corresponding to a predetermined numeric code, the combination of said two marker
5 layers determining both a numeric place and a value within said place in a binary numbering system.

26. A process for marking an article by applying thereto a taggant, a marking formulation comprising a taggant, wherein the taggant comprises a microparticle having two distinguishable marker layers of different color characteristics wherein the paired
10 combination of color characteristics provided by said two layers codes for a numeric value.